

AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior listings and versions of claims in the application:

1-52. (cancelled)

53. (currently amended) A method for treating nucleic acid, comprising:

a) providing:

i) a purified archaeal FEN-1 endonuclease; and

ii) a nucleic acid substrate;

b) treating said nucleic acid substrate under conditions such that said substrate forms one or more cleavage structures; and

c) reacting said endonuclease with said cleavage structures so that one or more cleavage products are produced,

wherein said archaeal FEN-1 endonuclease comprises an *Archaeoglobus fulgidus* FEN-1 endonuclease.

54. (cancelled)

55. (currently amended) The method of Claim ~~54~~ 53, wherein said *Archaeoglobus fulgidus* FEN-1 endonuclease comprises SEQ ID NO:179.

56. (previously presented) The method of Claim 53, wherein said purified archaeal FEN-1 endonuclease is provided as part of a mixture, said mixture further comprising a second structure-specific nuclease, wherein said reacting said endonuclease with said cleavage structures in step c) comprises reacting said cleavage structure with said mixture.

57. (previously presented) The method of Claim 56, wherein said second structure-specific nuclease comprises a polymerase.

58. (previously presented) The method of Claim 57, wherein said polymerase comprises a thermostable polymerase.

59. (previously presented) The method of Claim 58, wherein said thermostable polymerase comprises a thermostable DNA polymerase altered in amino acid sequence such that it exhibits

reduced DNA synthetic activity from that of a corresponding wild-type DNA polymerase but retains substantially the same 5' nuclease activity of said wild-type DNA polymerase.

60. (previously presented) The method of Claim 53, wherein said nucleic acid of step (a) is substantially single stranded.

61. (previously presented) The method of Claim 53, wherein said nucleic acid of step (a) is double stranded.

62. (previously presented) The method of Claim 61, wherein said treating of step (b) comprises:

- i) rendering said double-stranded nucleic acid substantially single-stranded; and
- ii) exposing said single-stranded nucleic acid to conditions such that said single-stranded nucleic acid has secondary structure.

63. (previously presented) The method of Claim 62, wherein said double stranded nucleic acid is rendered substantially single-stranded by the use of increased temperature.

64. (previously presented) The method of Claim 53, further comprising the step of detecting at least one of said one or more cleavage products.

65-89. (cancelled)

90. (currently amended) A method for treating nucleic acid, comprising:

- a) providing:
 - i) a purified archaeal FEN-1 endonuclease;
 - ii) a source of a target nucleic acid, said target nucleic acid comprising first and second portions, wherein said second portion is downstream of and contiguous to said first portion;
 - iii) a first oligonucleotide comprising a 5' portion complementary to said first portion of said target nucleic acid; and
 - iv) a second oligonucleotide comprising a 3' portion and a 5' portion, wherein said 5' portion is complementary to said second portion of said target nucleic acid;

- b) generating a cleavage structure wherein at least said 5' portion of said first oligonucleotide is annealed to said first portion of said target nucleic acid and wherein at least said 5' portion of said second oligonucleotide is annealed to said second portion of said target nucleic acid; and
- c) exposing said cleavage structure to said FEN-1 endonuclease to generate a cleavage product,

wherein said archaeal FEN-1 endonuclease comprises *Archaeoglobus fulgidus* FEN-1 endonuclease.

- 91. (previously presented) The method of Claim 90, further comprising the step of d) detecting said cleavage product.
- 92. (previously presented) The method of Claim 90, further comprising the step of generating a second cleavage structure, said second cleavage structure comprising said cleavage product hybridized to a third oligonucleotide.
- 93. (previously presented) The method of Claim 92, further comprising the step of exposing said second cleavage structure to said FEN-1 endonuclease to generate a second cleavage product.
- 94. (previously presented) The method of Claim 93, further comprising the step of detecting said second cleavage product.
- 95-96. (cancelled)
- 97. (currently amended) The method of Claim ~~96~~90, wherein said *Archaeoglobus fulgidus* FEN-1 endonuclease comprises SEQ ID NO:179.
- 98-105. (cancelled)

106. (previously presented) The method of Claim 90, wherein said 3' portion of said second oligonucleotide comprises a 3' terminal nucleotide not complementary to said target nucleic acid.

107. (previously presented) The method of Claim 90, wherein said 3' portion of said second oligonucleotide consists of a single nucleotide not complementary to said target nucleic acid.

108. (previously presented) The method of Claim 90, wherein at least one of said first oligonucleotide and said second oligonucleotide is attached to a solid support.